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Mindful Yoga: An Evaluation of a Stress-Reduction Intervention for Stressed Adults

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Mindful Yoga: An Evaluation of a Stress-Reduction Intervention for Stressed Adults

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This study will attempt to integrate mindfulness meditation and yoga to take advantage of the benefits of both interventions and the popularity of yoga, proposing a pilot of a mindful yoga intervention. The second purpose of this study is to assess the effectiveness of mindful yoga at increasing mindfulness, as measured by the Mindfulness Awareness Attention Scale, and to assess mindfulness as the mechanism of change through which well-being is enhanced. One hundred adults, who are yoga and meditation beginners and between the ages of 35 and 45, would be recruited from the community to participate in this study. The study utilizes a walking group control and a mindful yoga intervention group. Before treatment condition effects would be assessed, a one-way ANOVA would be conducted with the pre-test outcome scores as the dependent variable and treatment group as the independent variable to assess potential pre-test differences. It is not expected that the two groups will differ significantly at baseline, so it is expected that the ANOVA will not be significant. In order to investigate possible differences between participants on the five dependent variables (satisfaction with life, perceived stress, blood pressure, medical symptom checklist, mindfulness awareness) a repeated measures MANOVA would be conducted with one between-subjects factor and one-within subjects factor. The present study predicts that increases in mindfulness will mediate the effect of treatment on perceived stress, satisfaction with life, physical symptoms, and blood pressure (measures of well-being). In order to analyze this effect, change scores will be created for the mindfulness and the well-being outcome measures for the change from pretest to posttest. While there is limited research supporting this integration, both yoga and mindfulness interventions have shown to be beneficial for the reduction of stress and the enhancement of various measures of well-being (Grossman et al., 2004; Baer, 2003). It is predicted that mindfulness will mediate the relationship between treatment and increase in measures of well-being. Support of this hypothesis indicates that the mindful yoga intervention will likely increase mindfulness, and it will provide further empirical evidence that mindfulness is the therapeutic factor responsible for enhancing well-being.

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CHAPTER ONE: INTRODUCTION

Research shows that stress disorders are on the rise (Murray & Lopez, 1996; Goldberg & Yecrubier, 1995; Duhault 2002). This may well be attributed to the ever-increasing demands placed on individuals in an already fast-paced life. With constant demands being placed on the time and resources of all individuals, the common resulting effect, stress, may be nearly impossible to avoid. Therefore, the need for stress reduction techniques has never been more pressing.

Researchers have looked to meditation techniques as a way to help individuals better cope with stress (Kabat-Zinn, 1982; Goleman, 1988). The term meditation encompasses a variety of techniques differing in their approach and origin (Goleman, 1988). Two of the techniques that have garnered the most attention are mindfulness meditation and yoga (Ospina, 2008). Mindfulness meditation is a technique in which one sits with bare attention, so as to gain insight into the habits one has which continue one's own suffering (Kabat-Zinn, 1999; Baer, 2003; Hanh, 1974). Yoga is a term that encompasses many techniques, but it literally means to "unite" the self with the divine (Iyengar, 1979). Yoga differs from mindfulness in that yogic meditation is generally concentration meditation, which focuses the mind, where mindfulness expands the attention (Goleman, 1988).

Both mindfulness meditation and yoga have been used as clinical interventions and have shown potential efficacy as stress reduction techniques (Grossman, 2004; Baer, 2003; Arias, Steinberg, Banga, and Trestman, 2006; Ospina et al., 2008; Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005; Pilkington, Kirkwood, Rampes, &

Richardson, 2005). Mindfulness interventions are more thoroughly researched and their efficacy has more clear support, but the research on yoga has shown promising results (Ospina et al., 2008; Arias et al., 2006; Khalsa, 2004; Raub, 2002).

The objective of the proposed study is to create a new mindfulness intervention, which incorporates yoga and mindfulness techniques. Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 1990) is an existing mindfulness intervention that includes yoga as a component. In the proposed intervention, the structure of MBSR is used, yet yoga is used as the primary technique to cultivate mindfulness. This study attempts to combine the unique benefits of the practice of yoga and the practice of mindfulness. Mindfulness interventions have shown to improve well-being and reduce psychological distress, but yoga may add to these benefits because it is a physical activity, which has also shown to contribute to physical and psychological well-being.

Yoga is already a well-accepted stress reduction technique in mainstream culture, yet there is insufficient research supporting its efficacy (Yoga Alliance, 2005; Arias et al., 2006). Many individuals view it as a form of exercise, which may make it more attractive than mindfulness interventions. Dimidjian and Linehan (2003) described that some may not want to participate in mindfulness interventions because they seem too similar to meditation or Buddhism. While mindfulness interventions, have attempted to adapt mindfulness to be a secular, clinical intervention, yoga may be more attractive and less threatening to some.

This study will attempt to integrate mindfulness meditation and yoga to take advantage of the benefits of both interventions and the popularity of yoga. The mindful

yoga intervention will target a community sample that endorse experiencing chronic stress. Chronic stress is stress that goes beyond life challenges and becomes problematic (Karasek, 1979).

The integrative analysis will begin with a discussion of the consequences of stress and the importance of coping with stress effectively. The mindful yoga intervention is designed to prevent the development of more serious conditions by reducing stress. The integrative analysis will then focus on one of the most popular ways of coping with stress, meditation, specifically mindfulness meditation and yoga. The available literature on each of these forms of meditation, including existing interventions and the benefits of each, will be discussed. The analysis will conclude with a discussion of the integration of yoga into the current family of mindfulness trainings.

CHAPTER TWO: INTEGRATED ANALYSIS

Stress and Its Consequences

The task of understanding how individuals cope with stress has become increasingly important, considering that psychological and environmental stressors can contribute to the development psychological disorders and medical diseases, in the absence of adequate resources (Vaillant, 2000). Folkman and Lazarus (1986) hypothesize that when faced with a stressful event, all people attempt to manage the demands of the event. The effectiveness of an individual's coping may or may not be successful. After several studies, the authors concluded that stress and coping are a part of a transactional process in which the person and environment have a bidirectional influence on one another (Lazarus & Folkman, 1984b). Several factors influence an individual's chosen method of coping, including personality factors and his or her appraisal of the situation (Folkman & Lazarus, 1986). When individuals view a situation as unchangeable, they often use distancing and escape-avoidance, which are forms of coping that the individual utilizes to shift focus away from the troubling situation (Folkman & Lazarus, 1986). Escape-avoidance coping has been associated with depressive symptoms by several researchers (Vollman et al., 2007; Blalock et al., 2008; Cronkite, Moos, Twohey, Cohen, & Swindle Jr., 1998; Seiffge-Krenke & Klessinger, 2000) suggesting this method of coping is ineffective.

Stress is defined as one's demands exceeding one's resources, (Folkman & Lazarus, 1984). Coping resources can be defined as physical, social, psychological, and material assets (Folkman, 1988). Self-esteem, health, energy, stamina, and availability of

social support are examples of important resources in coping (DeLongis, Folkman & Lazarus, 1988;Pearlin & Schooler, 1978; Folkman, 1984). Demands can be described as perceived threats to one's well-being (Folkman, 1988).

The use of the word "stress" differs from the concept of a life challenge which are part of a healthy life (Duhault, 2002). In this discussion, "stress" refers to the transactional relationship between the person and the environment that occurs when an individual perceives his or her well-being to be endangered. When an individual enters the state of the stress response, hormones are released, and over time, entering this state frequently has shown to have serious biological consequences and resulting negative affective or social states. (Henry, 1992; Mroczek & Almeida, 2004).

Chronic stress is the specific focus of the study proposed. Chronic stressors can be defined as stressors that are consistent or recurrent difficulties in one's life (Karasek, 1979). These are often identified as work overload or the combination of excessive demands and lack of control over work tasks (Karasek, 1979). These stressors can also be a conflict between different social roles, such as parent and professional (Eckenrode & Gore, 1990; Pearlin, 1999a; Repetti, McGrath, & Ishikawa, 1999). Stressors may also include excessive complexity in one's life and restriction of choices experienced in everyday life (Wheaton, 1997).

Chronic stress has the potential to lead to burnout. Burnout is a psychological syndrome that occurs in response to chronic stressors in one's work or social environment. (Freudenberger, 1975; Maslach, 1976; Maslach, Schaufeli, & Leiter, 2001). Burnout is comprised of three dimensions: emotional exhaustion, cynicism, and

inefficacy (Maslach, Schaufeli, & Leiter, 2001). Several studies indicate that burnout negatively impacts an individual's quality of life, including one's mental health. Burnout is also linked to several diseases, such as cardiovascular disease, diabetes, musculoskeletal disorders, and impaired fertility (Armon, Shirom, Shapira, & Melamed, 2008).

The experience of stress is related to both emotional and financial costs for society (Greenberg P.E., Sisitsky T., Kessler R.C., Finkelstein S.N., Berndt E.R., Davidson J.R., Ballenger J.C., Fyer, A.J., 1999). The World Health Organization Global Burden of Disease Survey (Murray & Lopez, 1996) predicted that by 2020 depression and anxiety, including stress-related mental health conditions, will become highly prevalent and second only to heart disease in severity of disabilities experienced by suffers. Additionally, the World Health Organization Collaborative Study of Psychological Problems in General Health Care found that 10.4% of nearly 26,000 individuals in fourteen countries reported were diagnosed with depression or stress-related anxiety (Goldberg & Yecrubier, 1995). Duhault (2002) stated that stress-related problems are beginning to exceed infectious diseases in contribution to worldwide health problems. These projections suggest that the study of stress-related mental health conditions is of the utmost importance

Chronic stressful experiences can cause despair, which can increase the risk of depression and drug abuse (Gold & Chrousos, 2002; Volkow & Li, 2004; Fox et al., 2007; Koob & Kreek, 2007). Additionally, a recent review of studies linked stress to heart disease and related conditions (Esler, Schwartz, and Alvarenga, 2008). Esler and

colleagues (2008) found support that stress is one of the primary predictors of heart disease, and numerous epidemiological studies indicate that mental stress can cause Coronary Heart Disease (Esler, Schwarz & Alvarenga, 2008). They found strong evidence that individuals with high blood pressure have been exposed to recurrent stress. With the widespread occurrence of cardiovascular disease and high blood pressure, this evidence suggests that chronic stress is indeed an epidemic.

While daily stressors may vary in individuals' lives, those who consistently perceive their stressors as unmanageable are at risk for developing burnout or psychopathology. Offering individuals a better means of coping at an early stage will likely prevent stress leading to the development of a more serious condition. Prevention is an emerging framework that has "long been recognized as a vital and unique aspect of the identity of counseling psychologists" (Gelso & Fretz, 2001). As Conyne (2004) states it has become more efficacious to teach individuals collectively the competencies they need so that they can successfully cope with demands of life. When using a prevention approach, one attempts to intervene at the first signs of risk factors, rather than after the development of a disorder or disease.

Prevention can be defined as "efforts that result in one or more of the following: (a) stopping a problem behavior from ever occurring; (b) delaying the onset of a problem behavior; (c) reducing the impact of a problem behavior; (d) strengthening knowledge, attitudes, and behaviors that promote emotional and physical well-being; (e) promoting institutional, community and government policies that further physical, social, and emotional well-being" (Romano & Hage, 2000b). The objective of the present study most

closely aligns with part (d) of the definition. The mindful yoga intervention will attempt to instill "knowledge, attitudes, and behaviors" to improve psychological well-being and physical health.

Researchers have looked to self-care methods that are less invasive than traditional medical approaches to help individuals improve and prevent stress-exacerbated diseases, including anxiety depression, substance abuse, cancer, and heart disease. Meditation and yoga have been two of the self-care methods that have been extensively researched for this purpose (Goleman, 1988; Gremer, Ronald & Fulton, 2005). In the following section, the research on meditation will be discussed, and the available meditation techniques will be introduced.

Meditation

Meditation is a spiritual and healing practice that has been practiced for more than 5000 years (Feuerstein, 2002; Walters, 2002). Recently, the term *meditation* has gained more frequent use in medical literature, indicating a shift from its origins as a religious practice to a more widespread definition as a secular means to help train one's attention (Kabat-Zinn, 1994). As stress-induced disorders and diseases have increased, researchers have looked to the practices of meditation and yoga for methods to alleviate suffering (Goleman, 1988). Western physicians, psychologists, and health researchers have studied the psychophysiological effects of various types of meditation since the 1950's, but this line of research has mostly developed over the past twenty years (Barrows & Jacobs, 2002; Banadonna, 2003; Murphy & Donovan, 1999; West, 1987; Ospina, 2008).

Currently, there have been approximately 1,500 studies on meditation (Gremer, Roland & Fulton, 2005). Meditation techniques have gained acceptance as mind-body interventions within the integrative medicine movement (Ospina, 2008). It is estimated that there are 10 million practitioners in the United States and hundreds of millions worldwide (Deurr, 2004).

Meditation is a term that encompasses many techniques. Meditative practices derive from traditions in both Eastern and Western cultures, and most of world's religions and cultures have meditative practices that share many similarities (West, 1987; Goleman; 1988). Christianity, Islam, and Judaism each have their own meditative practices, yet Buddhist and Indian forms have garnered the most research attention. Commonly used forms of meditation are: mindfulness or Vipassana Meditation, Transcendental Meditation ™, Sahaja Yoga, Relaxation Response, Kundalini Yoga, and meditative prayer (Arias, 2006). Mantra meditation, mindfulness meditation, and yoga techniques are the most extensively studied (Ospina, 2008). Different techniques vary in psychological effects, therapeutic value, and potential complications (Dunn, Hartigan & Mikulas, 1999). The wide variety of perspectives on meditation and the complex nature of the techniques have led to large differences in the therapeutic effects reported (Ospina, 2008).

Two reviews of the available meditation techniques have been performed, using stringent criteria for evaluation of the available studies (Ospina et al., 2008; Arias, Steinberg, Banga, and Trestman, 2006). Overall the existing studies of meditation techniques are poor in methodological quality, but there has been a statistically

significant increase in the quality in recent years (Ospina et al, 2008). Most of the studies of meditation techniques have studied healthy populations and the prevention of clinical conditions, yet these are difficult to generalize to more severe populations (Ospina et al, 2008). Promising results have also been found for the treatment of mood and anxiety disorders, autoimmune illness, and emotional disturbance in neoplastic disease (Arias, Steinberg, Banga, and Trestman, 2006). Further research is needed to identify specific biological mechanisms involved in each meditation technique so that they can be applied appropriately (Ospina et al., 2008).

Mindfulness

In the following sections, mindfulness meditation will be discussed in more detail. The discussion will begin with a description of what mindfulness meditation is, and then discuss how the concept has been operationalized. The discussion will then summarize the major clinical interventions developed to cultivate mindfulness. This summary will provide the foundation for the proposed mindful yoga intervention. The relevant mindfulness empirical literature will then be discussed, as well as the hypothesized mechanisms of mindfulness interventions. This will provide information on the current state of the mindfulness literature and the areas in which the proposed study can improve on past studies. The discussion will then shift to focus on yoga.

Mindfulness Meditation: A Description

Mindfulness or insight meditation has recently received much attention. This is a Buddhist meditative practice. This practice differs from practices that exclusively focus

on concentration. Concentration meditation focuses attention on one specific object, such as the breath, a word or manta, a phrase, prayer, mental image, physical object, or thought. Whenever the mind wanders away from this object, the meditator continually and nonjudgmentally brings his or her awareness back to it. Concentration elicits the relaxation response, counteracting the fight/flight response (Benson, 1977). These practices lead to calmness, relaxation, equanimity, and, at advanced stages invoke experiences of bliss, ecstasy, and absorption.

Concentration meditation is the first meditation technique of Buddhist meditation, and mindfulness meditation is the second (Wallace, 2005). While practicing mindfulness, one's attention is systematically expanded to encompass a physical or mental activity from moment-to-moment with an attitude of detachment and acceptance, moving beyond the restricting attention of concentration. Thich Nhat Hanh, Zen master, (1976) describes mindfulness as "keeping one's consciousness alive to the present reality."

According to Buddhist psychology, suffering comes from how one relates to unavoidable life challenges, such as sickness and death (Germer, Siegel, & Fulton, 2005). The first of the four noble truths described by the Buddha is called *duhkha*, which refers to the suffering associated with the constant drive to avoid discomfort and seeking pleasure, which can lead to a perpetual feeling of dissatisfaction (Hagen, 1997). In avoiding pain, one is escaping the present moment. Mindfulness training's original purpose is to rigorously train the mind to let go of attachments that cause suffering. This

process is intended to be done with compassion, but it may be unpleasant and challenging at times. Therefore, mindfulness is not a relaxation technique.

Jon Kabat-Zinn, a well-known mindfulness researcher, is largely responsible for adapting Mindfulness Meditation for Westerners by presenting it secularly (Kabat-Zinn, 1982; 1990; Baer, 2003). Researchers have sought to adapt the practice of mindfulness from its Buddhist origins because of the many psychological and physical benefits are associated with this practice (Kabat-Zinn, 1982, 2000). The following section will discuss the development of mindfulness, as a construct to be researched.

Mindfulness as a Construct

Many have attempted to describe the mindful state. Kabat-Zinn (1999, p. 4) describes it as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally." Marlatt & Kristeller (1999, p. 68) define it as "bringing one's complete attention to the present experience on a moment-to-moment basis." Seigel (2007) states, "mindfulness in its most general sense is about waking up from a life on automatic, and being sensitive to novelty in our everyday experiences. With mindful awareness the flow of energy and information that is our mind enters our conscious attention and we can both appreciate its contents and also come to regulate its flow in a new way. …It involves being aware of the aspects of the mind itself" (p. 5).

Bishop (2002) called attention to the need to operationally define mindfulness, create a measurement procedure, and validate its construct validity. Several have attempted to operationally define and measure the construct, as well as validate the

measures (Buchheld, Grossman & Walach, 2002; Brown & Ryan, 2003; Baer, Smith, & Allen, 2004; Baer et al., 2006; Feldman et al, 2007; Lau, 2006), yet Grossman (2008) recently noted the difficulty in defining mindfulness, as it is an elusive concept. He states that there are discrepancies even among mindfulness experts about its definition and many scale constructors have limited knowledge of Buddhist thinking and meditation. Despite these difficulties, there are commonalities across all definitions and operationalizations, specifically, that mindfulness refers to paying attention to the present moment. While recognizing its limitations and lack of subtly, this definition appears to be at the core of mindfulness. Shapiro et al. (2008) also noted that these measures have advanced research of mindfulness interventions because the cultivation of mindfulness can be measured. The following section will explore the available mindfulness interventions.

Mindfulness as a Clinical Intervention

The present study attempts to build on the previous mindfulness interventions that have been developed, particularly Mindfulness Based Stress Reduction (MBSR) (Kabat-Zinn, 1982; 1990). In order to familiarize the reader with the most prominent and frequently studied interventions, a brief description of each is included. For a more in-depth discussion of each, the reader will be referred to appropriate sources.

Mindfulness-Based Stress Reduction (MBSR)

Jon Kabat-Zinn (1982) is credited with developing a secular mindfulness training for Westerns. The first mindfulness intervention, Stress Reduction and Relaxation

Program, was developed in a behavioral medicine setting for patients with chronic pain and stress-related conditions (Kabat-Zinn, 1990). This program is now titled Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 1982; 1990). MBSR has emerged as one of the better known mindfulness training programs and has been shown to be beneficial for a number of presenting problems, including: mood symptoms, chronic pain, eating disorders, fibromyalgia, and cancer (Grossman, et al, 2004). The program is based on intensive training in mindfulness meditation. The program requires a strong commitment by its participants as it is an 8-week course with weekly sessions of two to three hours and requires extensive homework and practice. A wide variety of mindfulness exercises are taught and didactic information about stress is a component of most of the sessions. The participants meet for a group discussion and the leader models a mindful attitude to further help the participants cultivate this curious, nonjudgmental approach. MBSR includes several mindfulness techniques, both formal and informal, including walking meditation, yoga, body scan, seated meditation, and everyday life mindfulness tasks, which offer people the opportunity to try many techniques and find the one that is most enjoyable for them.

Kabat-Zinn (1990) conceptualizes yoga as meditation rather than simply exercise. Participants have reported that they find it easier to remain attentive while practicing yoga than the other two practices. Kabat-Zinn encourages MBSR teachers to "take it (MBSR), innovate with it, make it your own practice, so you can teach what you know" (Boyce, 2009). With that in mind, finding further adaptation of this intervention would be in the spirit of its creation and possibly more advantageous for those participating in the

programs. As yoga is a popular technique within MBSR and a popular and effective stress reduction technique, it may be a potential modality for teaching mindfulness on its own.

Subsequent Mindfulness Interventions

Since the creation of MBSR, numerous other mindfulness interventions have been developed, and in some way, each has been inspired by MBSR (Block-Lerner, Salters-Pedneault & Tull, 2005). The three most prominent of the subsequent mindfulness interventions are Mindfulness-Based Cognitive Therapy (MBCT) (Segal, Williams, & Teasdale, 2002), Dialectical Behavior Therapy (DBT) (Linehan, 1993a), and Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, & Wilson, 1999).

Mindfulness Based Cognitive Therapy (Segal et al., 2002) was built upon MBSR. MBCT is focused on depression rather than stress and integrates cognitive therapy exercises into the program. Dialectical Behavior Therapy (Linehan, 1993a) is an intervention originally developed for borderline personality disorder. It differs from other mindfulness interventions in that it draws from Christian contemplative practices and Zen practice, and it employs exercises that are shorter in length than in MBCT and MBSR because to be more suitable for the borderline population. Acceptance and Commitment Therapy (Hays, Strosahl, & Wilson, 1999) differs in that it was developed as an individual mode of therapy. Similar to DBT, ACT is a behavior-change strategy, in which emphasis is placed on developing cognitive flexibility (Hayes et al., 1999; 2006).

Each of these interventions differs in the techniques they use to cultivate

mindfulness and in the focus of the intervention, yet each is attempting to build greater acceptance of the individual's experience in order to alleviate distress. The variations among these interventions lend support to the notion that there are many ways to cultivate mindfulness. Kabat-Zinn (Boyce, 1999) is quoted as encouraging MBSR instructors to adapt the MBSR program based on which techniques they find effective, and as yoga is the most popular technique of the three techniques in MBSR, a mindfulness intervention with a more extensive use of yoga may be beneficial and popular. The following section will explore the empirical support for the available mindfulness interventions.

Empirical Support of Mindfulness

This section will serve to explore the efficacy of the available mindfulness interventions, methodological deficits of this literature, and the methodological improvements that have been made. Much of the research on mindfulness has focused on intervention studies (Baer, 2003). While there is needed improvement in the investigation of mindfulness interventions, the several review of the literature suggests that mindfulness interventions have much to offer (Grossman, Niemann, Schmidt, & Walach, 2004; Baer, 2003; Bishop, 2002; Toneatto & Nguyen, 2007; Kabat-Zinn, Lipworth & Burney, 1985). The reviews have found that mindfulness interventions have been implemented in a variety of settings to treat numerous conditions including chronic pain, anxiety, depression, medical diseases, and stress.

Baer's review (2003) found that mindfulness studies show significant improvements on ratings of anxiety (Kabat-Zinn et al., 1992), depression (Kabat-Zinn,

1995; Teasdale et al., 2000), pain (Kabat-Zinn, Lipworth & Burney, 1985) and binge eating symptoms (Kristeller & Hallett, 1999). Speca, Carlson, Goodey, and Angen (2000) found that cancer patients in a MBSR group reported significant improvements on measures of mood disturbance and stress levels.

Studies with a nonclinical population have also shown positive treatment effects. Massion, Teas, Herbert, Wertheimer, and Kabat-Zinn (1995) found a significant effect on melatonin levels, which are linked to health and immune functioning. Astin (1997) and Shapiro et al. (1998) studied student populations who engaged in MBSR training. Shapiro et al. (1998) found significant effects on psychological symptoms, empathy rating, and spiritual experiences. Astin (1997) found significant improvements in stress and an increase in overall sense of control. Williams, Kolar, Reger, and Pearson (2001) performed a study using MBSR training to decrease daily hassles, psychological distress, and medical symptoms. The participants were a self-selected community sample, who were randomly assigned to either a MBSR group or a control group. Attrition was lower in the intervention group, and the researchers found a significant decrease from baseline for all participants in the intervention group, which was maintained at three-month follow-up. Bishop (2002) concluded that MBSR is a highly effective psychosocial approach for the management of stress and mood disturbance in cancer and showed strong efficacy in nonclinical populations.

Grossman et al. (2004) focused their review on studies evaluating Mindfulness Based Stress Reduction (MBSR). The studies using an active control group had a mean

effect size of .49. Grossman noted that this favorably compared to the .58 mean effect size for studies with an inactive, or wait-list, control group, which lacked control of the nonspecific effects. This similarity in effect size gives support to the specificity of the mindfulness intervention. Baer (2003) found a mean effect size of .74 (SD=.39) across fifteen mindfulness intervention studies. These mean effect sizes suggest that, on average, mindfulness interventions have a medium to large effect size (Cohen, 1997).

Bishop (2002) discussed that some of these nonspecific effects may be similar to other group interventions, in that they increase social support or self-efficacy (Newton & Doron, 2000; Williams & Williams, 1997; Levinson, 1992). In considering the effect of the therapeutic factors that may result from the nature of the group setting, Yalom's research on group therapeutic factors may be useful. Yalom (2005) discussed several therapeutic factors that capture how group therapy is helpful to participants. Several of these may play a role in the effectiveness of group mindfulness interventions, including the instillation of hope, universality, and group cohesion. Yalom (2005) argues that the instillation of hope, or the client's faith that the treatment will be effective, is essential in any therapy and can play a major role in a client's improvement. Many mindfulness interventions target specific populations, and for participants, the realization that others suffer similar symptoms may alleviate much of their distress and give them a sense of the universality of human suffering. Also, the cohesiveness of the group, analogous to the client-therapist relationship in individual therapy, may be one of the potent factors in group settings because group members may offer support and acceptance to other

participants. The social support that results from group cohesion relates to Bishop's (2002) evaluation of potential therapeutic factors in mindfulness interventions.

Grossman cautioned that despite the moderate to large effect sizes of MBSR studies, they should be viewed with consideration of the several methodological flaws in the literature. The studies generally had limited follow-up data, yet there is some support for the long-term benefits. Baer (2003) found a mean effect size at follow-up of .59 (SD=.41). Grossman et al. (2007) recently published a study of mindfulness training for fibromyalgia patients, in which a postintervention follow-up was conducted three years after the patient's completion of the training. The authors found that the participants' responses to the measures suggested that the benefits of the training were maintained (Cohen d effect size postintervention, .40-1.10, and effect size at 3-year follow-up, .50-.65). These results provide more substantial support for long-term benefits.

Other methodological flaws included the lack of control groups, small sample sizes, and lack of operationalization of the mindfulness construct. With the recent development of several empirical measures of mindfulness (Baer, Smith, & Allen, 2004; Brown & Ryan, 2003; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006), it is now possible to better operationalize and measure if mindfulness interventions actually cultivate mindfulness and if mindfulness accounts for improvements in well-being. Initial studies do seem to support these hypotheses (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2005; Lau et al., 2006; Shapiro, Brown, & Biegel, 2007; Carmody & Baer, 2007; Brown & Ryan, 2003; Carlson & Brown, 2005).

Despite needed improvement in methodology, most reviews concluded that studies showed moderate to large effect sizes, suggesting mindfulness-based interventions may assuage a range of mental health problems and improve psychological functioning. Baer (2003) found a low attrition rate across many studies, concluding that despite the heavy demands of these programs, people are inspired to complete them. Grossman (2004) similarly concluded that mindfulness interventions have great potential to help people cope with chronic stress. Teasdale et al. (1994) describes mindfulness as a "generic skill" that is applicable to many situations and facets of experience. It can be applied to a wide range of thoughts, feelings, and experiences because it teaches individuals to turn toward their unpleasant and uncomfortable thoughts, rather than engaging in escape-avoidance coping.

Hypothesized Mechanisms of Mindfulness

As mindfulness research has developed, researchers have begun to ask themselves what mechanisms in mindfulness trainings elicit positive changes, and do the existing mindfulness interventions actually induce mindfulness. Bishop (2002) raised a concern as to whether mindfulness is the primary therapeutic component in mindfulness trainings. While studies deconstructing mindfulness trainings have yet to be done, Shapiro (2006) and Lynch (2006) have presented theories about the mechanisms at work in mindfulness trainings. This section will explore the theories that have been proposed to explain how mindfulness works, so these mechanisms can be employed in the proposed study.

Shapiro et al. (2006) presented a model of mindfulness comprised of three axioms: intention, attention, and attitude, derived from Kabat-Zinn's (1994 p. 4)

definition of mindfulness "on purpose (intention) paying attention (attention) in a particular way (attitude)." The authors propose that these three axioms are at play simultaneously in a cyclical process.

In Buddhism, the purpose of meditation is to attain enlightenment and to cultivate compassion, yet the authors argue this is sometimes lost in secular definitions. Having a purpose when practicing is essential, and while an initial intention may bring someone to practice, the intention is dynamic and evolving with deepened insight and practice.

Attention is at the core of secular definitions and refers to observing one's external and internal experience moment-to-moment. Shapiro et al. argues that the self-regulation of attention found in mindfulness would likely enhance attentional abilities as a whole. Teasdale et al. (1995) discussed that acting mindfully is in contrast to operating on 'automatic pilot.' Instead of automatically reacting, one can step out of a stream of thought unrelated to the present moment. Lynch et al. (2006) presents that attentional control may improve emotional regulation (Philippot, Schaefer & Herbette, 2003) and reduce rumination (Borkovec & Costello, 1993).

Kabat-Zinn (1990) proposed seven attitudinal foundations of the mindfulness practice. These foundations are non-judging, patience, a beginner's mind, trust, non-striving, acceptance, and letting go. He describes them as interrelated, with each being dependent on the others. Individuals practice recognizing the pattern of constantly judging and labeling, which allows one to see things as they truly are. By accepting the present moment as it is, without attempting to reframe or deny, and bringing a new perspective to every moment, practitioners cultivate letting go of attachments to ways of

thinking, such as familiar automatic thoughts. Also, practitioners recognize that things may unfold in time and accept this, and they learn to trust their own internal voice rather than looking externally for answers. While cultivating these attitudinal factors, one also practices non-striving, which is key to moving away from "doing" and beginning to practice "being." Shapiro et al. (2006) built on Kabat-Zinn's description of these attitudes, and further emphasized the importance of bringing compassion to attention. Rather than being "cold and critical," individuals can observe experiences with compassion and without evaluation even when they are painful or aversive experiences. Intentionally bringing this attitude to the attentional practice leads to "patience, compassion, and non-striving" (Shapiro et al 2006, p. 377).

Kabat-Zinn (1990) states that anyone is capable of being mindful. Shapiro et al. (2006) describes the process of becoming mindful as a developmental step, much like the shift that occurs when children become less self-absorbed and develop awareness of other's feelings and needs. She and her colleagues call this development reperceiving, which they define as a fundamental shift in perspective from automatic thoughts to the perception of the thought process. An important distinction is that this observation is not a detachment. Lynch et al. (2006) also makes the distinction that DBT emphasizes a full experience of the moment rather than detachment. By fully experiencing each thought without pulling away or distracting one's self, practitioners learn to be less reactive and more aware of their own experiences. Shapiro and colleagues propose that several other factors arise out of reperceiving, including: self-regulation, values clarification, cognitive, emotional, and behavioral flexibility, and exposure. Similarly, Lynch and colleagues

(2006) proposed that the mechanisms of change in mindfulness include behavioral exposure and learning new responses, emotion regulation, reducing literal beliefs, and attentional control.

Beddoe (2006) proposed that mindfulness might function as a coping strategy and provide skills for meaning-based coping. Meaning-based coping is the attempt to maintain positive well-being (Folkman & Greer, 2000). These skills or strategy might influence the stress appraisal by fostering inner resources, and as a result, altering behaviors and physiologic changes associated with the stress response.

Several hypotheses have been put forth to explain what changes occur when one cultivates mindfulness. While each of these hypotheses is still in a theoretical stage, they advance the mindfulness literature toward a better understanding of why mindfulness meditation improves psychological functioning. Shapiro et al. (2006), Lynch et al. (2006), and Beddoe (2006) hypothesize that mindfulness improves coping. Shapiro et al. (2006) and Lynch et al. (2006) also propose that mindfulness shifts people's attention into a mode of fully experiencing their emotions, leading to improved tolerance one's emotions, rather than falling back on automatic processing. Both sets of authors argue that, as a result of this full experiencing, self-regulation and attentional control is improved. This full and present experience appears to be at the core of what theorists find useful about mindfulness interventions, so teaching of individuals to fully experience the present moment will be the focus of the proposed intervention.

Yoga

The preceding sections reviewed the relevant literature on mindfulness, and as the proposed study attempts to create an intervention primarily using yoga to cultivate mindfulness, the discussion will now shift to review the relevant literature on yoga. While the current mindfulness interventions have been shown to be effective, other modalities to cultivate mindfulness may be more attractive and more accessible to participants. As mindfulness is a natural human capacity (Shapiro et al., 2006) and a skill that can be developed through many methods (Bishop et al, 2004), it is necessary to study the many ways in which mindfulness can be cultivated. In this study, mindful yoga is proposed as one of the many ways to cultivate mindfulness. This section will include an introduction to yoga, a review of studies utilizing yoga interventions, and the concept of mindful yoga will be introduced.

Yoga: A Description

Yoga is a Sanskrit word derived from the word "yuga" meaning union or yoke, with the idea that one is attempting to unite the mind, body, and soul (Iyengar, 1979). Yoga is a practice originating in India, and it encompasses many practices that have the goal of leading to transcendence into bliss. There are four paths of yoga: karma (the yoga of action, the path of selfless service); bhakti (the yoga of devotion); raja (the yoga of controlling the mind, the scientific approach); and, jnana (the yoga of knowledge, the philosophical approach) (Feuerstein, 2001). Raja yoga includes hatha yoga, which is how yoga is most commonly recognized in the West. The eight limbs of raja yoga were compiled by Patanjali in the Yoga Sutras (Raub, 2002). These limbs consist of the yamas

(restraints), niyamas (observances), asanas (postures), pranayama (breathing techniques), pratyahara (control of attention), dharana (concentration), dhyana (meditation) and Samadhi (super-conscious state) (Iyengar, 1979). In the West, hatha yoga is most commonly practiced, and it includes asanas (poses/postures) and meditation (Raub, 2002).

Yogic philosophy has many similarities to Buddhism (Feuerstein, 2001). For the purposes of this study, the most important distinction is between mindfulness meditation and hatha yoga. Hatha yoga generally has the goal of calming the mind, while mindfulness meditation has the goal of observing the mind to gain insight. In the following sections, this is discussed further.

Yoga as a Clinical Intervention

There is a paucity of research on yoga as a psychological intervention and few studies with strong methodological rigor. A wide range of yoga techniques have been applied as therapeutic interventions, ranging from breathing to postures, so there is no standard format of interventions (Khalsa, 2004). There have also been a wide variety of populations and conditions to which yoga interventions have been applied (Arias, 2006). Due to the large variations in the yoga literature, it is difficult to summarize its entirety. In order to focus the scope of this review, studies that apply to psychological and physiological outcomes will be presented, as they are most applicable to the present study.

Yoga has been found to elicit the "relaxation response" and lead to "deep relaxation of the autonomic nervous system without drowsiness or sleep and a type of cerebral activity without highly accelerated electrophysiological manifestation" (Bagchi & Wenger, 1957). Because of the psychophysiological effect yoga has, it has been applied as a therapeutic intervention for a number of disorders (Khalsa, 2004).

Kirkwood, Ramps, Tuffrey, Richardson, and Pilkington (2005a, 2005b) performed two reviews of studies using yoga interventions. The first review focused on yoga treating anxiety (2005b) and the second focused on interventions treating depression (2005a). In the review focused on depression, five randomized controlled trials were located, with severity of depression ranging from mild to severe. All trials reported positive findings and no adverse effects were reported, with the exception of fatigue and breathlessness in one study. Pilkington et al. (2005a) noted that the study lacked many methodological details such as method of randomization, compliance, and attrition rates. These studies indicated that yoga is potentially beneficial to individuals suffering from depression, but the inconsistency in the severity of depression and intervention used, restricts the generalizability of these findings. Kirkwood et al. (2005b) similarly found that of the eight randomized controlled studies reviewed positive results were reported, but there were many methodological shortcomings. Yoga does appear to be an anxiety intervention with "encouraging" results.

Thien Thomas, Markin, and Birmingham (2000) performed a study for an eating disorder population. The authors found that the intervention improved the quality of life

of those who practiced yoga. Schell et al. (1983) studied the physiological and psychological effects of hatha-yoga on healthy women. The authors found a decline in heart rate during and after yoga practice with a return to normal baseline after the experiment in those who practiced yoga, and they found that the yoga group had significantly higher life satisfaction and positive temperament traits.

The body of literature about the physiological effects of yoga is more extensive than the literature concerning psychological outcomes, with several studies investigating yoga as physical exercise (Raub, 2002). The intense stretching and muscle condition that is performed while holding yoga postures increases skeletal muscle oxidative capacity and glycogen utilization, which are important determinants of endurance performance (Shephard and Astrand, 2000). Murugesan, Govindarajuluand, Bera (1999) Patel (1975), Patel (1975b), and Sunder et al. (1984) performed randomized controlled trials of yoga interventions for hypertension compared to active control groups, but all lacked in sample size. These studies found yoga to be an effective method of reducing systolic blood pressure and Patel (1975b) found that results were maintained at the twelve-month follow-up. Roogla et al. (2001), Spicuzza et al (2000), and Stanescu et al. (1981) found that yogic breathing techniques while doing yoga postures substantially improves oxygen delivery to tissues that are associated with chemoreflex sensitivity to hypoxia. A preliminary study showed that yoga may improve quality of sleep in those suffering from insomnia (Khalsa, 2004). Kristal (2005) has shown evidence of yoga promoting weight loss in healthy adults. Nayak and Shankar (2004) and Thien, Thomas, Markin, and

Birmingham (2000) found that yoga can counteract decreased bone mass and arthrosclerosis.

Georg Feuerstein (2004) described that the distinction between yoga and Buddhism is a "false and an unconstructive dichotomy." He described yoga as a powerful transformative discipline and, "if practiced authentically and with the requisite dedication, it can bring about inner change even at the entry level of posture practice that is the focus of its Western practitioners" (Boccio, 2004, p. x). He describes that the hatha yoga postures were traditionally intended to serve as a vehicle to the spiritual aspects of the yogic process. The breathing in the postures prepares the body for meditation. Meditation is the path through which profound changes can occur about how individuals perceive themselves and the world, so meditation is at the heart of both yogic and mindfulness practices.

Yoga as a Mindfulness Intervention

The purpose of this study is to build on the foundation created by Mindfulness Based Stress Reduction. As discussed previously, yoga meditation is a form of concentration meditation, in which one narrows the focus of attention to calm the mind. Mindfulness meditation opens the scope of attention, watching thoughts arise, which allows the practioner to gain insight into the patterns of the mind. While yoga and mindfulness meditation have different approaches to meditation, it may be possible to integrate the two to combine the benefits of each. Hatha yoga postures allow an individual to observe one's response pattern when encountering different emotions and

events, such as discomfort. If one attempts to watch these reactions with kind attention, this would be an application of mindfulness.

There is limited empirical support for this integration to date. There has been one dissertation that integrated Mindfulness Based Stress Reduction and Iyengar Yoga (Beddoe, 2006). While this study attempted to maintain the fidelity of teaching mindfulness, the yoga and MBSR techniques were disconnected from one another in application. The goal of this study will be to integrate the practice of mindfulness more fully with the practice of the hatha yoga postures. The adaptation of MBSR appears to be in keeping with Kabat-Zinn's intention when teaching MBSR instructors, as he encourages them to make MBSR their own by using the techniques they find most helpful (Boyce, 1999). Mindful hatha yoga is one of the major components of MBSR, and in *Mindfulness Yoga* (Boccio, 2004) hatha yoga is offered as a mindfulness technique, as it is in keeping with Buddha's teachings to practice mindfulness while "stretching one's limbs" and "bending over" (p. 68). This study intends to expand the hatha yoga component of MBSR to be the primary technique to cultivate mindfulness. The reasons for utilizing yoga throughout the mindfulness training are threefold: (1) to capitalize on yoga's popularity as a stress reduction technique (2) to combine the benefits of yoga and mindfulness training (3) to make mindfulness training more accessible.

By repackaging mindfulness with a focus on yoga, even more people may be attracted to this program than are to MBSR. Kabat-Zinn's Stress Reduction Program or MBSR estimates that 17,000 participants have completed the program ("Background and

Testimonials," n.d.). Feuerstein (2004) states that there are approximately two to three million Buddhist practitioners and fifteen to twenty million yoga practitioners in the United States, and there is a growing trend to more fully engage with yoga as a spiritual path, beyond a physical exercise. According to Yoga Alliance (2005), the national association of yoga instructors, many individuals begin yoga as a method of stress reduction. With these estimates it seems that yoga attracts many more Americans than Buddhism, suggesting that a program focused on yoga may be more popular than one framed around Buddhist meditation.

This study capitalizes on the potential of both yoga and mindfulness to improve the psychological and physical well-being of those chronically stressed. Shapiro (2006) and Lynch (2006) have hypothesized that mindfulness meditation changes individuals' perception of stress and leads to improved self-regulation and coping. Raub (2002) similarly hypothesized that yoga may change an individual's approach to stress. Both yoga and mindfulness appear to reduce individuals' reaction to stress and help individuals reduce stress, yet yoga has the added benefit of conditioning the body. Muscoskeletal and cardiovascular improvements have been found as a result of the gentle physical activity involved in practicing hatha yoga postures (Shephard & Astrand, 2000; Birkel & Edgren, 2000; Konar et al., 2000; Ray et al., 2001; Telles et al., 2000; Tran et al., 2001; Yadav & Das, 2001). Combining the practice of mindfulness and yoga may allow individuals to reap the benefits of insight into the perpetual patterns of thought, which is achieved through mindfulness, and the benefits of physical activity through hatha yoga.

Additionally, hatha yoga has been accepted into the mainstream and is taught in numerous locations (Raub, 2002). Yoga is often, and mistakenly, associated with exercise in Western culture, but this could be used to advantage by attracting a wider scope of participants. Individuals may find yoga to be more attractive than other mindfulness interventions. Kabat-Zinn (1990) noted that many participants in MBSR grow anxious to begin the yoga component the program and enjoy this component more than the others. Dimidjian and Linehan (2003) noted that some may find current mindfulness interventions "esoteric or foreign" or "too closely identified with meditation." While Baer (2003) found interest in mindfulness trainings to be high, it may be that an intervention advertised to have a focus on yoga would attract a population who may be initially dissuaded by meditation. Mindfulness interventions teach individuals cost-effective stress reduction techniques, which participants can practice long after the intervention (Teasdale, et al., 2000). Yoga classes are widespread in their availability, and they appear to be growing more and more popular, making the continuation of the practices learned in the intervention easier to maintain (Yoga Alliance, 2005).

CHAPTER THREE: PROPOSED STUDY

Statement of Purpose

The primary purpose of the proposed study is to assess the effect of a mindful yoga intervention on measures of well-being and mindfulness. This a pilot study of the proposed mindful yoga intervention. A growing body of literature suggests that mindfulness interventions improve emotional and physical well-being in a variety of populations and disorders. In particular, Mindfulness Based Stress Reduction (MBSR) appears to be efficacious in reducing stress (Astin, 1997; Miller, Fletcher, & Kabat-Zinn, 1995; Speca, Carlson, Goodey, & Angen, 2000; Baer, 2005). Yoga is a popular stress reduction technique that has been accepted by mainstream culture and has shown to in research studies to reduce stress-related symptoms (Raub, 2002; Arias et al., 2006). The mindful yoga intervention builds on the structure and format of MBSR, so it is likely to achieve a similar effect on the outcome variables, and it may have a greater effect on physical well-being due to the physical activity involved in practicing hatha yoga postures. The intervention created in this study attempts to take advantage of effectiveness of mindfulness meditation, as well as the benefits of a hatha yoga practice.

While this study is not replicating the MBSR manualized program, the mindful yoga intervention utilizes the program's structure by including didactic information and group process. As discussed in the literature review, MBSR utilizes many techniques as vehicles for cultivating mindfulness, including hatha yoga and seated meditation. This

intervention will use both seated meditation and hatha yoga as techniques to cultivate mindfulness.

Additionally, there have been many methodological problems noted in previous studies of MBSR (Grossman et al., 2004; Baer, 2003; Arias et al., 2006; Ospina et al., 2008). This study will attempt to improve upon these studies by including an active control group, using randomization, including follow-up information, and assessing the effect of the intervention on the cultivation of mindfulness, as well as, the effect of the cultivation of mindfulness on the well-being outcome measures.

The second purpose of this study is to assess the effectiveness of mindful yoga at increasing mindfulness, as measured by the Mindfulness Awareness Attention Scale, and to assess mindfulness as the mechanism of change through which well-being is enhanced. Shapiro (2008; Shapiro, 2007; Oman et al., 2008) has found support for the mediating role of mindfulness in the relationship between MBSR and measures of well-being. If mindfulness does account for a substantial portion of the variance in the relationship between the intervention condition and the outcome variables, this would lend support to the validity of the mindful yoga intervention as a viable mindfulness intervention.

The following section proposes an analysis to compare a mindful yoga (MY) intervention to a walking group (WG) intervention. The study will track 74 participants who were randomly assigned to either the MY or WG treatment groups targeting chronic stress, which will provide adequate power to detect an interaction between groups. The participants will be recruited from the local community in a mid-size Southwestern city,

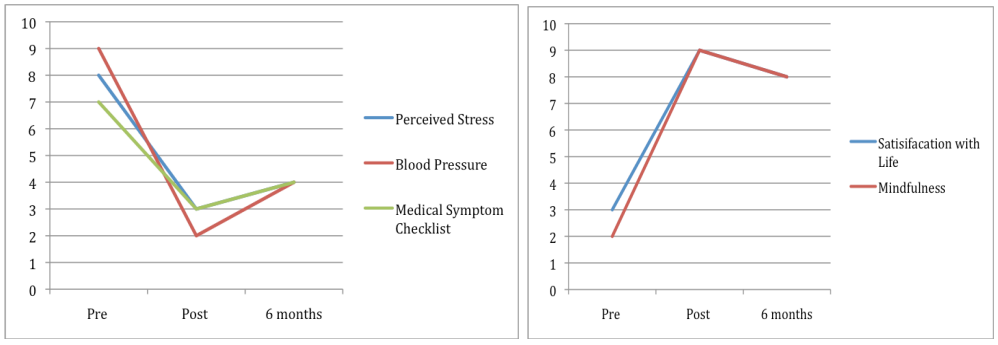
and the interventions will take place at a local community recreation center. Their level of mindfulness, emotional well-being, and physical well-being will be assessed at three time points. Time 1 will be prior to the interventions and serve as a baseline. Time 2 will be directly after the intervention is completed and serve as a postintervention assessment. Time 3 will be assessed six months after the completion of the intervention and serve as follow-up information to assess how well the outcomes were maintained. At each time point, participants will complete a series of assessment tools including the Perceived Stress Scale (PSS), Satisfaction with Life Scale (SWLS), Blood Pressure (BP), Pennebaker Inventory of Limbic Languidness (PILL), and Mindful Attention Awareness Scale (MAAS). The PSS, SWLS, and MAAS have been frequently used in studies with similar objectives (Shapiro et al., 2008; 2007; Oman et al., 2008), and blood pressure is frequently used as an indicator of physical strain (Cohen, Evans, Krantz, & Stokols, 1986; Friedman & Rosenman, 1974; McClelland, 1979). The PILL has been used in the stress literature (Lok & Bishop, 1999).

Hypotheses and Rationale

Hypothesis 1: Compared to the walking group control participants, it is hypothesized that participants in the mindful yoga condition will demonstrate greater improvement on the set of outcome variables (satisfaction with life, perceived stress, physiological symptoms, blood pressure and mindfulness) from pre- to post-test, and these improvements will be maintained across time (6 months post treatment).

The reviews performed by Grossman et al. (2004) and Baer (2003) indicate that there is support for mindfulness-based interventions improving psychological functioning and well-being. The literature indicates that experimental participants in mindfulness studies often exhibit fewer health issues and less psychological distress (Grossman et al, 2004; Baer, 2003). Additionally, reviews performed by Pilkington et al. (2005), Kirkwood (2005), and Arias (2006) found yoga interventions produced improvements on measures of mood and distress. Using yoga as a vehicle for mindfulness may enhance the benefits of current mindfulness interventions with the improvement in physical health as a result of practicing yoga postures.

Well-being will be measured by psychological and physiological self-report measures, and one external physiological measure. These measures include both measures of psychological distress and positive outcomes of improved well-being. Psychological Distress was measured by the Perceived Stress Scale, the Pennebaker Inventory of Limbic Languidness, and Blood Pressure. Each of these is expected to decrease as a result of the intervention. Positive outcomes were measured by Satisfaction With Life and Mindfulness Awareness Attention Scale, and each of these is expected to increase as a result of the intervention. Two graphs below illustrate the expected directions.



Hypothesis 2: It is hypothesized that increases in mindfulness will mediate the effects of treatment on satisfaction with life, perceived stress, physical symptoms, and blood pressure.

While several studies have shown mindfulness interventions improve various measures of well-being, few studies have attempted to measure if mindfulness was increased by the intervention, and if mindfulness is the primary therapeutic factor that leads to improved well-being. Brown and Ryan (2003) and Carlson and Brown (2005) found that trait levels of mindfulness (Mindfulness Awareness Attention Scale) correlated with measures of cognitive and affective indicators of mental health, including lower levels of emotional disturbance and higher levels of well-being. Four studies have been performed that show mindfulness interventions do increase measured levels of mindfulness (Shapiro, 2008), and Shapiro et al. (2007), Carmody and Baer (2007) found that mindfulness mediated mental health outcomes. Therefore, it appears that mindfulness may be the primary therapeutic factor in mindfulness interventions. This assertion will be assessed.

Method

Approval by Human Subjects Committee

This study will be in compliance with the guidelines set forth by the Institutional Review Board for the Protection of Human Subjects at the University of Texas at Austin. In addition, this study will comply with the Ethical Principals designated by the American Psychological Association. Participation in this proposed study will be voluntary and contingent upon participant consent.

Participants

Adults between the ages of 35 and 45 will be recruited from the community to participate in this study. Individuals who are true beginners to yoga and meditation will be eligible (defined as never having taken a yoga or meditation class before).

Recruitment

The study's recruitment process will involve coordination with local yoga studios, as well as advertisements at local restaurants, coffee shops, and universities. The advertisements will discuss a stress management program involving yoga and walking. Individuals who respond will be informed that that they would either be placed in a yoga group or a walking group. They will also be informed that if one intervention is found be more effective, they will be offered this intervention, at the conclusion of the study.

Eligibility

Inclusion criteria for participation are (a) participants self-identifying as having unmanageable stress and (b) a doctor's approval that the postures will not be injurious to the participant. Exclusion criteria include having (a) current substance abuse problems (b) current suicidal ideation and (c) psychosis. Those who are excluded will be referred to psychological services in the community.

Randomization

Approximately 100 adults from the community will be recruited. Interested individuals will complete consent forms, indicating their willingness to be randomly assigned either to the mindful yoga group or the walking group. Only those individuals willing to be randomly assigned to either the intervention or active control group will be included in the study. Of those recruited, it is expected that 74 participants will meet these criteria, give their informed consent to participate, and be randomly assigned to an intervention group (n = 37) or a wait-list control group (n = 37). Past mindfulness intervention studies have had an average effect size of approximately .49 and have detected significant difference posttreatment with sample sizes ranging from 21 to 97 participants (Grossman et al., 2004; Baer, 2003). As tested by GPower, a sample size of 74 will provide adequate power to detect an interaction between groups based on an effect size of .49.

Assessment

Participants in both the intervention group (mindful yoga) and control group

(walking group) will be measured three times: (1) before the intervention, (2) immediately after the completion of the intervention, and (3) six months after termination of the intervention.

Group Leaders

Both interventions will be lead by a licensed psychologist. The mindful yoga group will be lead by an individual who has completed the Oasis Mindfulness-Based Professional Education and Innovation at the Center for Mindfulness, directed by Jon Kabat-Zinn, and will be a registered yoga instructor. The walking group will be lead by individual who regularly uses walking groups in his or her practice and is well versed in the intervention and group process.

Description of the Mindful Yoga Intervention

The mindful yoga intervention used in this study is based on the Mindfulness Based Stress Reduction (MBSR) intervention and the sequence of postures offered by Frank Boccio in *Mindfulness Yoga* (2004), which uses hatha yoga postures as a vehicle for cultivating mindfulness. MBSR consists of eight 2.5 hour sessions over eight weeks, one half-day meditation retreat, and daily homework assignments. *Mindfulness Yoga* introduces the concept of using yoga postures as a locus of the practice of mindfulness meditation. The structure of MBSR is used and supplemented with material from *Mindfulness Yoga*. Tables 1 and 2 below include an example of the MBSR protocol, as well, as the treatment protocol used in this study.

The mindful yoga intervention will begin with an introduction to mindfulness, yogic philosophy, and the foundational hatha yoga postures that will be used throughout the course. This will include a description of the yamas and niyamas which are the guidelines for life set forth in the in the eightfold path of Patanjali. These include observances such as self-kindness and abidance to the truth of our capabilities and limitations when doing postures. While the spiritual teachings of Four Establishments of Mindfulness (Buddhism) and the eightfold path of Patanjali (yoga) will serve as a foundation for the intervention, this information will be presented in a secular fashion with respect for the spiritual beliefs of the participants.

In keeping with MBSR and *Mindfulness Yoga*, the participants will begin practicing seated meditation in the first session and continue throughout subsequent sessions, as well as in their homework. This practice will allow participants to become familiar with mindfulness and cultivate this practice so that they can apply this form of attention while doing yoga postures (Boccio, 2004). On days when participants meet with the instructor, no homework will be assigned. Each week new postures will be introduced, building the sequence of postures used. The program will consist of three primary components 1) theoretical material related to mindfulness, meditation, yoga and the mind-body connection 2) experiential practice of meditation and yoga during the group meetings and homework 3) group process focused on problems participants encounter when applying the mindfulness.

Also, the focus of the meditation each week will build. In *Mindful Yoga,* Boccio offers a sequence of postures to practice for each of the Four Establishments of Mindfulness derived from the Buddha's *Anapanasati Sutta* (See Table 2 and Appendix for examples). The first focus is on awareness of the body and breath (Body as Body), and the second expands the focus to awareness of one's feelings or emotions (Feelings as Feelings). The third shifts focus to awareness of the mental formations (Mindfully Aware of the Mind), and the fourth focus is to recognize the mind as an object of attention (Awareness of Objects of Mind). These progressive shifts in focus are meant to build insight into the nature of one's mind and it's patterns. In each phase, participants will be encouraged to be fully present with the stimuli they experience.

Description of the Walking Group Intervention (Control)

The walking group will serve as the active control group. These participants will meet for sixteen session of walking for 1 hour. They will also be asked to walk for 30-45 minutes each day that they are not in session. The group will be lead by a mental health practioner who will encourage the members to provide support to one another. Walking groups have been used in several studies and has been linked to improvements in mental health and overall well-being (Brugman & Ferguson, 2002; Ekkekakis, Hall, VanLanduyt & Petruzzell, 2000; Lee, Goldberg et al., 2001; Faulkner & Sarkes, 1999). The primary components of the walking group intervention are (1) physical activity and (2) group factors, such as group cohesion, making the group comparable to the mindful yoga group.

Table 1: MBSR Protocol	
Week	MBSR
Week 1 & 2	Body scan, 6 days per week, 45 minutes a day. Sitting with awareness of breathing, 10 minutes per day.
Week 3 &4	Alternate body scan with yoga (45 minutes) if possible, 6 days per week. Continue sitting with awareness of breathing 15-20 minutes per day.
Week 5 &6	Sit 30-45 minutes per day, alternating with yoga. Begin walking meditation.
Week 7	Practice 45 minutes per day using your own choice of methods, either alone or in combination. (Day Long Retreat)
Week 8	Do body scan twice this week. Continue with the sitting and the yoga.

Table 2: Treatment Protocol		
Week	Mindful Yoga	Walking
Week 1, Session 1&2	Introductory yoga practices. Beginning to focus on Body as Body	Walk with group 1 hour
Homework	Sitting with focus on breathing, 10 minutes per day. Practicing yoga practices at home.	Walk alone 30-45 minutes
Week 2, Ses. 3&4	Expanding to include more yoga postures. Continuing Body as Body.	Walk with group 1 hour
Homework	Continue to sit with awareness of breathing, 10 minutes per day. Practice Week 2 sequence of yoga postures at home.	Walk 30-45 minutes alone.
Week 3, Ses. 5&6	Beginning to expand focus to Feelings as Feelings	Walk with group 1 hour
Homework	Sit with awareness of breathing and feelings, 15-20 minutes per day. Practice Week 3 sequence of postures at home.	Walk 30-45 minutes alone.
Week 4, Ses. 7 & 8	Continuing to focus on Body as Body and Feelings as Feelings while building more yoga postures into the sequence.	Walk with group 1 hour
Homework	Sit with awareness of breathing and feelings, 15-20 minutes per day. Practice Week 4 sequence of postures at home.	Walk 30-45 minutes alone.

Measures

Perceived Stress Scale

The *Perceived Stress Scale* (Cohen, S., Kamarck, T. & Mermelstein, R., 1983) is one of the most frequently used instruments when assessing level of stress. This instrument is based on the premise that the impact of "objectively" stressful events are somewhat influenced by an individual's perceptions of the event's stressfulness (Lazarus, 1966, 1977). This measure attempts to tap the degree to which events in an individual's life are appraised as stressful (Cohen, S., Kamarck, T. & Mermelstein, R., 1983). The *PSS* is a 14 item scale measuring the unitary construct of perceived stress. An item from the scale includes "In the last month, how often have you felt nervous and 'stressed'?" For each item on the scale, the participants are asked to rate the intensity of their somatic and cognitive anxiety on a five-point Likert scale from 0 (never) to 4 (very often). Cohen et al. (1983) reported adequate reliability and validity, with a test-retest reliability of .85 for a college sample and .55 in the community sample. Construct and concurrent validity has been deemed sufficient for this scale.

Satisfaction with Life Scale (SWLS)

The Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) has been frequently used to measure subjective well-being and is designed to assess global satisfaction with life (Pavot & Diener, 1993). Life satisfaction has been identified as a distinct construct describing cognitive and global evaluation of quality of one's life as a

whole (Pavot & Diener, 2008). This is a five-item measure that has been shown to have good content and concurrent validity (Pavot & Diener, 1993). Individuals respond to items on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Diener et al. (1985) initially evaluated the psychometric properties of the scale, and based on a sample of 176 undergraduates, the scale had an internal consistency of a=.87 and test-retest reliability of .82. In 1993, Pavot and Diener reviewed the studies that used the scale and the measures of internal consistency and reliability across the studies. Internal consistency ranged from.79 to .89 and test-rest reliability ranged from .50 to .84 across six studies. Responses are then summed to produce the total SWLS score, with higher scores indicating higher life satisfaction.

Pennebaker Inventory of Limbic Languidness (PILL)

The Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982), consisting of 54 items related to the experience of various physical symptoms and sensations (e.g. racing heart, chest pain, nausea) will be used to measure participants' physical health complaints. Participants are asked to rate each of the 54 symptoms on a 5-point scale of experienced frequency during the past month, ranging from "have never experienced the symptom" (1) to "very often experienced the symptom" (5). By summing these frequency responses across items a total score for the PILL is obtained. This instrument demonstrates adequate internal consistency and reliability, with coefficient alphas ranging from .88 to .91 and test-retest reliability ranging from .79 to .83 (Pennebaker, 1982). Validation studies of the PILL have indicated that high scorers used

more aspirin, made more physician and health-center visits, and had more health-related work absences than low scorers (Pennebaker, 1982).

Blood Pressure

Blood pressure was included as an objective measure of physical strain and physical well-being. Evidence (Cohen, Evans, Krantz, & Stokols, 1986; Friedman & Rosenman, 1974; McClelland, 1979) suggests that elevated blood pressure is a reasonable gross indicator of sympathetic nervous system activation. The participants' blood pressure will be calculated with a sphygmomanometer cuff attached to an automated, portable digital monitor. These automated machines are beneficial due to eliminating observer sources of error in blood pressure assessment (Krantz & Falconer, 1997). The measurement was taken three times. The mean of the three measures of systolic pressure and that of the three measures of diastolic pressure were used to calculate the index of mean arterial pressure (MAP) for each respondent [MAP = diastolic blood pressure + (systolic blood pressure − diastolic blood pressure)/3]. Higher numbers equate to greater amount of pressure in the vascular system; therefore, lower numbers are preferable. Research suggests that this mode of blood pressure measurement is effective in providing a measure of blood pressure that highly correlates with intra-arterial measurement (correlation coefficients .94-.98) (Reeves, 1995).

Mindfulness Awareness Attention Scale MAAS

Mindfulness Awareness Attention Scale (MAAS; Brown & Ryan, 2003) is a single-factor scale designed around an attention-based definition of mindfulness. It is a

15-item trait measure of one's attention or lack of attention to present-moment experiences in everyday activities. The MAAS uses a Likert scale ranging from 0 (almost always) to 6 (almost never) to assess such items as ''I find myself listening to someone with one ear, doing something else at the same time'' and ''I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.'' The MAAS has demonstrated reliable internal consistency (coefficient $\alpha = .82$) and expected convergent and discriminant validity correlations (Brown & Ryan, 2003). The authors also showed that scores were significantly higher for practitioners of mindfulness meditation than those for control groups of nonmeditators. Higher scores indicate more presence of attention to the present moment experience or mindfulness.

The MAAS was chosen because it has been the most frequently used in the recent mindfulness literature (Shapiro, 2008). This will allow the results of this study to be compared to other mindfulness intervention studies. Also, the measure is a small number of items (15) with high internal consistency, giving it greater power as a measure.

Statistical Analysis

Preliminary Analysis

Before treatment condition effects are assessed, a one-way ANOVA will be conducted with the pre-test outcome scores as the dependent variable and treatment group as the independent variable to assess potential pre-test differences. It is not expected that the two groups will differ significantly at baseline, so it is expected that the ANOVA will not be significant.

Hypothesis 1: Treatment Effects

In order to investigate possible differences between participants on the five dependent variables (satisfaction with life, perceived stress, blood pressure, medical symptom checklist, five factor/mindfulness awareness) a repeated measures MANOVA will be conducted with one between-subjects factor and one-within subjects factor. The between subjects factor will be group membership and have two levels, mindful yoga group and walking group. The within subjects factor will be time with three levels: pretest, posttest, and 6 month follow-up. It is expected that there will be a significant interaction effect between condition and time on the five dependent variables taken together.

A repeated measures MANOVA (RM MANOVA) requires that the following assumptions be met for use of the design: (1) independent sampling of the observations; (2) multivariate normality; (3) sphericity or variances of the differences of all pairs must be equal. A violation of the independence of observations assumption is very serious, and if even a small violation occurs, power and level of significance may be affected (Stevens, 1999). In this study, participants are not from intact groups and will be randomly assigned to treatments groups, minimizing the likelihood of dependence among observations. If observations are not normally distributed in each group, power and level of significance are only slightly affected, and as sample size is greater than 20, the design will be robust to this violation (Stevens, 1999). If the sphericity assumption is not met, a Greenhouse-Geisser adjustment will be used.

The overall RM MANOVA for the five outcome measures is expected to indicate a significant multivariate F at the .05 level for the group condition by the time interaction. To determine which dependent variables are responsible for the significant overall effect, univariate analyses will be conducted next. A series of 3 x 2 repeated measures ANOVAs, each with a between-subjects factor of condition and a within-subjects factor of time, are expected to produce significant interactions between condition and time for each dependent variable. In order to investigate post hoc pretest to posttest comparisons, using difference scores calculated for each group, independent samples t-tests will be conducted. Bonferroni's adjustment will be made due to the multiple comparisons being tested (.05/number of comparisons, Keppel, 1991). These contrasts are expected to show that mindful yoga will demonstrate significant improvement on the five dependent variables compared to the control condition from the pretest to the posttest and that these improvements would be maintained at the follow-up.

Hypothesis 2: Mediation Analyses

The present study predicts that increases in mindfulness will mediate the effect of treatment on perceived stress, satisfaction with life, physical symptoms, and blood pressure (measures of well-being). In order to analyze this effect, change scores will be created for the mindfulness and the well-being outcome measures for the change from pretest to posttest. The data will be analyzed according to Baron and Kenny's (2008) conceptual and statistical recommendations for assessing the presence of mediator effects. Given that there are multiple outcome variables each one will be tested separately using the analytic steps outlined by Baron and Kenny (2008) These steps involve first

establishing that there is a correlation between the predictor variable and the outcome variable, showing that there is an effect to be mediated. The second step is to show that the predictor variable is correlated with the mediator, treating the mediator as an outcome variable. The third step is to illustrate that the mediator affects the outcome variable. The final step is to establish that mediator either completely or partially mediates the relationship between the predictor and the outcome variable, which should reduce the relationship between the predictor and the outcome to zero or substantially reduce it. The present mediation model predicts that mindfulness will partially mediate the relationship between the intervention condition and the outcome variable.

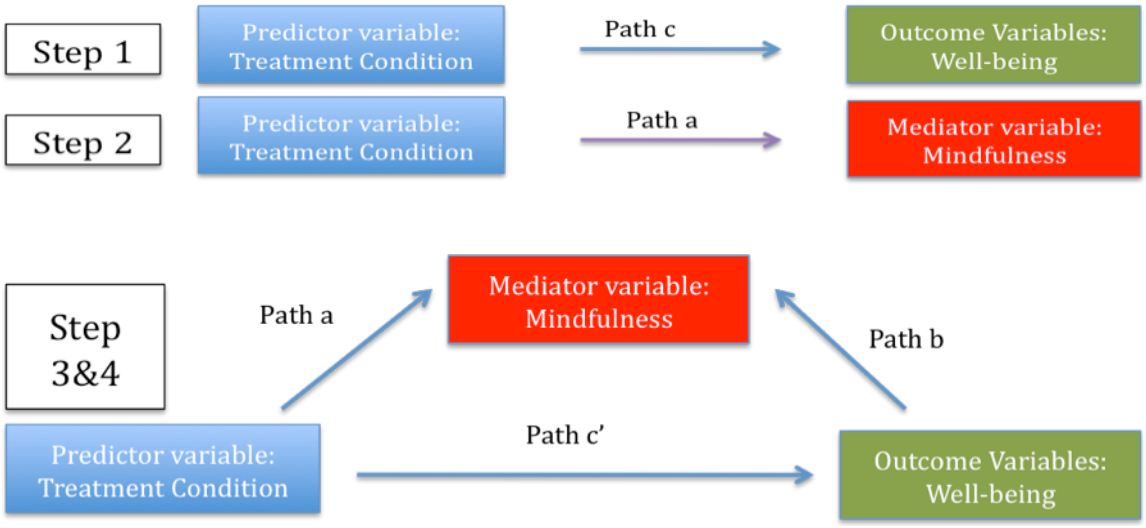
Following Baron and Kenny's model, the first step is to show that the independent variable (treatment condition) significantly affects the change over time in the outcome variables (satisfaction with life, perceived stress, physiological symptoms, and blood pressure). To test the first step of the model, change scores on each outcome variable will be regressed onto the predictor variable, which is the intervention condition. It is expected that the intervention condition will have a significant effect on the change scores of the outcome variables.

The second condition for mediation is to show that that the predictor variable (treatment condition) affects the mediator variable (mindfulness). The mindfulness change scores will be regressed on the treatment condition scores to establish Path c in the mediational chain (see the Figure: Step 1 below). It is anticipated that there will be a significant effect of treatment condition on the change scores of mindfulness.

The third step in the model is to establish a relationship between the mediator and outcome variable, controlling for the predictor. In this third equation, the change scores on each outcome variable will be used as the criterion variable in a regression equation and the mindfulness change scores and the treatment condition will be used as predictors. This will provide a test of whether mindfulness is related to the outcome variables (Path b), controlling for the treatment condition, It is predicted that the equation will demonstrate a significant effect of the mediator variable on the change scores of the outcome variables. The predicted effect of the mediator on the change in outcome variables will be tested in four regression equations, one for each outcome variable.

The last step in mediation analyses is establishing that the mediator variable completely mediates the relationship between the independent variable and outcome variables. This would be shown if the effect of treatment on the outcome variables is not significantly different from zero when controlling for the mediator variable. Four regression equations will be run, for the change over time in each outcome variable, one with each outcome variable (change over time in: satisfaction with life, perceived stress, physical symptoms, blood pressure) with treatment condition and change scores on mindfulness as the predictors. It is expected that the effect of treatment condition will be reduced once the mindfulness change scores are added into the analyses as a covariate, but they will not be reduced to zero. This finding will be evidence of partial, not complete, mediation, in that mindfulness does not account for all the variance in the relationship between the treatment condition and the outcome variables.

The partial mediation can be attributed to other factors being present that account for the relationship between the treatment and the outcome variables. Physical exercise may serve as a buffer when individuals encounter stress (Brown & Siegel, 1988; Chafin, Christenfeld, & Gerin, 2008). Physical activity may mediate the relationship between coping resources and disease states, indicating that physical activity may increase an individual's resources (Spirduso, Poon & Chodzko-Zajko, 2008). As yoga has been frequently used as a gentle form of exercise, the benefits of this activity may also mediate the relationship between the treatment and well-being.



CHAPTER FOUR: DISCUSSION

Summary of Results

The primary goal of this study is to assess the effectiveness of integrating mindfulness and hatha yoga in a clinical intervention in an effort to reduce chronic stress and enhance well-being. While there is limited research supporting this integration, both yoga and mindfulness interventions have shown to be beneficial for the reduction of stress and the enhancement of various measures of well-being (Grossman et al., 2004; Baer, 2003).

Previous research on mindfulness interventions has demonstrated reductions in stress and improvement on measures of well-being (Astin, 1997; Miller, Fletcher, & Kabat-Zinn, 1995; Speca, Carlson, Goodey, & Angen, 2000; Baer, 2005). Additionally, studies using yoga as an intervention have found reduction in stress and improvements in physiological measures (Raub, 2002; Arias et al., 2006). Yoga appears to have a similar psychosomatic effect to mindfulness interventions, in that participants in each family of interventions change their perception of stress. It appears that yoga may do this through relaxation and mindfulness may have an effect on individuals' regulation of emotion and coping. Yoga appears to have the additional effect of decreasing muscular tension and improving muscle oxidative capacity, indicating that the benefits are both physiological and psychosomatic (Raub, 2002).

The second goal of this study is to assess mindfulness as a potential mediator of the expected treatment effects. It is predicted that mindfulness will mediate the relationship between treatment and increase in measures of well-being. Support of this hypothesis indicates that the mindful yoga intervention will likely increase mindfulness. Additionally, if this hypothesis is confirmed it will provide further empirical evidence that mindfulness is the therapeutic factor responsible for enhancing well-being. This will build on the research of Cohen-Katz, Wiley, Capuano, Baker, & Shapiro (2005), Lau et al. (2006), Shapiro, Brown, & Biegel (2007), Carmody & Baer (2007), Brown & Ryan (2003), and Carlson & Brown (2005) whose initial studies have supported this hypothesis. Furthering the investigation of this hypothesis will be essential in supporting the efficacy of mindfulness interventions.

Limitations and Directions for Future Research

This study attempts to improve upon past methodological flaws in the mindfulness literature. One significant improvement is the use of a randomized control design and an active control group, to control for nonspecific group factors. Also, this study seeks to replicate the use of measures used in previous mindfulness studies in order to allow comparison to the results of the previous studies. Additionally, this study uses an external measure of well-being. As this measure is somewhat independent of demand characteristics, it gives greater credence to the validity of the proposed results.

There are several limitations to the proposed study. One weakness of this study is that it is an exploratory, pilot study in which a new mindfulness intervention is proposed. This intervention will need further research, but it is expected that it will have positive

results. Future studies should replicate the findings of this study to support its efficacy and should compare mindful yoga to a manualized MBSR intervention to measure if it is as effective as or more effective than MBSR. Also, the efficacy of mindful yoga as a clinical intervention will be improved with studies using clinical populations.

A second limitation of this of this study is the need for improvement in the operationalization of the constructs studied and the measurement of these constructs. Grossman (2008) argued that there is a need for qualitative research to assess what experienced meditators find to be important markers of the presence of mindfulness as a trait. It will also be important to address differences that may be found between those new to meditation and those who are more experienced. Grossman (2008) also discussed the limitations of self-report measures, which are subject to demand characteristics. It is possible that after one has invested so much time and effort in cultivating mindfulness that one would be inclined to endorse items on a mindfulness measure. These items have clear face value, which may be both a strength and a weakness.

Third, this study is limited in interpretation because it does not control for demand characteristics. Individuals in the mindful yoga group will be taught the benefits of mindfulness, so they may be more likely to endorse that they benefited from this intervention. The emphasis on the benefits of mindfulness in the mindful yoga intervention may also indicate to participants that they are in a more effective intervention condition than those in the walking group.

Fourth, the study of the mediating role of mindfulness is still in its initial stages and is limited by the operationalization and measurement of the construct of mindfulness. Also, there are likely several mediators in the relationship between intervention condition and well-being outcomes. In this study, it is likely that the physical activity involved in the practice of yoga will have a mediating role. There are also other factors that may play a role. Future research should explore other potential mediators so as to uncover what mechanisms lead to the enhanced well-being. This can also be achieved through studies that dismantle the various components in mindfulness interventions. Dismantling studies are a needed addition to the mindfulness literature.

APPENDICES

Appendix A: Mindful Attention Awareness Scale

DIRECTIONS: Please indicate how frequently you have the experience described in each of the following statements.

1=Almost Always 2=Very Often 3=Frequently 5=Rarely 6=Almost Never

1. I could be experiencing some emotion and not be conscious of it until some time later.
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in the present.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. I forget a person's name almost as soon as I've been told it for the first time.
7. It seems I am "running on automatic" without much awareness of what I'm doing.
8. I rush through activities without being really attentive to them.
9. I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.
10. I do jobs or tasks automatically, without being aware of what I'm doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I drive places on "automatic pilot" and then wonder why I went there.
13. I find myself preoccupied with the future or the past.
14. I find myself doing things without paying attention.

15. I snack without being aware that I'm eating.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. Journal of Personality and Social Psychology, 84(4), 822-848.

Appendix B: Perceived Stress Scale

DIRECTIONS: The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate your response based on the scale below, representing HOW OFTEN you felt or thought a certain way.

1= Never 2=Almost Never 3=Sometimes 4=Fairly Often 5=Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?

2. In the last month, how often have you felt that you were unable to control the important things in your life?

3. In the last month, how often have you felt nervous and "stressed"?

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

5. In the last month, how often have you felt that things were going your way?

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

7. In the last month, how often have you been able to control irritations in your life?

8. In the last month, how often have you felt that you were on top of things?

9. In the last month, how often have you been angered because of things that were outside of your control?

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

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Appendix C: Satisfaction with Life Scale (SWLS)

Directions: Please answer the following questions about yourself by indicating the extent to which you agree or disagree with each statement.

1=Strongly disagree 2=Disagree 3=Slightly disagree 4=Neither agree nor disagree 5=Slightly agree 6=Agree 7=Strongly agree

1. In most ways, my life is close to ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost everything.

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Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. Psychological Assessment, 5(2), 164-172.

Appendix D: The PILL (Physical Symptoms Questions)

Directions: Several common symptoms or bodily sensations are listed below. Most people have experienced most of them at one time or another. We are currently interested in finding out how prevalent each symptom is among various groups of people. On the page below, write how frequently you experience each symptom. For all items, use the following scale:

1=Have never or almost never experienced the symptom 2=Less then 3 or 4 times per year

3=Every month or so 4=Every week or so 5=More than once every week

For example, if your eyes tend to water once every week or two, you would answer "D" next to question #1.

___1. Eyes water

___2. Itchy eyes or skin

___3. Ringing in ears

___4. Temporary deafness or hard of hearing

___5. Lump in throat

___6. Choking sensations

___7. Sneezing spells

___8. Running nose

___9. Congested nose

___10. Bleeding nose

___11. Asthma or wheezing

___12. Coughing

___13. Out of breath

___28. Swollen joints

___29. Stiff or sore muscles

___30. Back pains

___31. Sensitive or tender skin

___32. Face flushes

___33. Tightness in chest

___34. Skin breaks out in rash

___35. Acne or pimples on face

___36. Acne/pimples other than face

___37. Boils

___38. Sweat even in cold weather

___39. Strong reactions to insect bites

___40. Headaches

___14. Swollen ankles

___15. Chest pains

___16. Racing heart

___17. Cold hands or feet even in hot weather

___18. Leg cramps

___19. Insomnia or difficulty sleeping

___20. Toothaches

___21. Upset stomach

___22. Indigestion

___23. Heartburn or gas

___24. Abdominal pain

___25. Diarrhea

___26. Constipation

___27. Hemorrhoids

___41. Feeling pressure in head

___42. Hot flashes

___43. Chills

___44. Dizziness

___45. Feel faint

___46. Numbness or tingling in body

___47. Twitching of eyelid

___48. Twitching other than eyelid

___49. Hands tremble or shake

___50. Stiff joints

___51. Sore muscles

___52. Sore throat

___53. Sunburn

___54. Nausea

Over the past three months, how many:

_____ Visits have you made to a health center or private physician for illness

_____ Days have you been sick

_____ Days your activities have been restricted due to illness

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NY: Springe-Verlag.

Appendix E: Mindful Yoga Sample Course Material

Examples from the first session of the course:

Directions for seated meditation:

1. "Breathing in a long breath, aware of breathing in a long breath. Breathing out a long breath, aware of breathing out a long breath."
2. "Breathing in a short breath, aware of breathing in a short breath. Breathing out a short breath, aware of breathing out a short breath."
3. "Breathing in, aware of my whole body. Breathing out, I am aware of my whole body."

Sample Directions for one hatha yoga posture:

Knee-to-Chest Pose

45-60 seconds each side

We begin to observe the breath and the body during movement. Let go of all you think you know about how your body moves. Attempt to bring an innocent or child's mind to the practice. Slowy slide the right knee along the floor, bending the knee toward the ceiling as you slide the foot toward the buttock. Pay attention to the feeling tone of the leg and the whole body as you do this. Can you feel any changes in your weight distribution or center of gravity in your pelvis as the foot moves into the buttock? Once

there, slowly lift the foot off the floor and bring the knee into your chest while holding it with both hands.

After 6-8 breaths, slowly lower the foot to the floor near the buttock and then slide it out to straight. Notice the discrete point where you can fully release the weight of the leg to the earth, and when you do, notice any changes in the breath and the feeling tone throughout the body. Have you been holding the breath or holding tension in the body? Repeat with the other leg.

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